ILFORD

BOOK OF
FORMULÆ

THIRD EDITION

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SPECIAL NOTES

MAKING UP SOLUTIONS

The figures for Avoirdupois and Metric systems are not interchangeable, but the finished solutions have approximately the same composition.

Dissolve the chemicals in the order given, except where otherwise noted, using about three-fourths of the water required. The water should be hot, then add cold water to make up the full amount.

ANHYDROUS SALTS

Where anhydrous salts are used instead of crystal, the following equivalents may be used:

Sodium Sulphite (cryst.) .. 100 parts = 50 parts anhydrous
Sodium Carbonate (cryst.) 100 ,, = 37½ ,, ,,
Sodium Carbonate (monohydrate) .. .. .. 100 ,, = 85½ ,, ,,

TEMPERATURE FOR DEVELOPMENT

The times given for development are for a temperature of 65°F. (18°C.)

DEVELOPERS FOR PLATES OR FILMS

ILFORD PYRO-SODA DEVELOPER ID—1

STOCK SOLUTION.

Pyrogallic Acid	1 oz.	or	25 grms.
Potassium Metabisulphite ..	100 grains	or	6 ,,
Water up to	10 ozs.	or	250 c.cm.

The potassium metabisulphite should be first dissolved in the water previous to adding the pyro.

A. WORKING SOLUTIONS.

Stock Solution of Pyro ..	2 ozs.	or	50 c.cm.
Water up to	20 ,,	or	500 ,,

B.

Sodium Carbonate (cryst.) (not bicarbonate) ..	2 ozs.	or	50 grms.
Sodium Sulphite (cryst.) ..	2 ,,	or	50 ,,
Potassium Bromide (10% Solution)	2 drams	or	6 c.cm.
Water up to	20 ozs.	or	500 ,,

Dish: For use mix equal parts of A and B.
Tank: ,, ,, ,, 1 part Stock Solution, 5 parts B and water 20 parts.

METOL-HYDROQUINONE (M.Q.) DEVELOPER ID—2

STOCK SOLUTION.

Metol	20 grains	or	1 grm.
Sodium Sulphite (cryst.) ..	3 ozs.	or	75 grms.
Hydroquinone	80 grains	or	4 ,,
Sodium Carbonate (cryst.) ..	2 ozs.	or	50 ,,
Potassium Bromide	20 grains	or	1 grm.
Water up to	20 ozs.	or	500 c.cm.

Dish: For use dilute 1 part with 2 parts of water.
Tank: ,, ,, 1 ,, ,, 5 ,, ,, ,,

DEVELOPERS FOR PLATES OR FILMS

METOL DEVELOPER ID—3

This developer gives negatives of soft gradation with maximum detail in the shadows. Development is slow, but the speed may be modified by altering the dilution.

Metol	50 grains		3 grms.
Sodium Sulphite (cryst.) ..	1 oz.		25 „
Sodium Carbonate (cryst.) ..	2 ozs.	or	50 „
Potassium Bromide	10 grains		0.5 „
Water up to	20 ozs.		500 c.cm.

For use, dilute 1 part with 3 parts of water.

PYRO-METOL DEVELOPER ID—4

This is an exceedingly energetic developer intended for plates which have received minimum exposures. On account of the yellowish colour of the image even very weak negatives may have good printing contrast.

A.

Metol	35 grains		2 grms.
Potassium Metabisulphite ..	100 „		6 „
Pyrogallic Acid	100 „	or	6 „
Water up to	20 ozs.		500 c.cm

B.

Sodium Carbonate (cryst.) ..	4 ozs.		100 grms.
Water up to	20 „	or	500 c.cm.

For use mix equal parts of A and B.

AMIDOL DEVELOPER ID—9

This is a good all-round developer. It requires no alkali but the sulphite is essential.

Sodium Sulphite (cryst.) ..	4 ozs.		100 grms.
Amidol	175 grains	or	9 „
Potassium Bromide	50 „		2 „
Water up to	20 ozs.		500 c.cm.

For use add three times its volume of water.

This developer will keep only for a day or two, any left over being useless.

CERTINAL DEVELOPER

The Ilford Concentrated Liquid Universal Developer which requires the addition of water only.

FOR PLATES AND FILMS.

For Dish development dilute 1 part with 15 parts water
„ Tank „ „ 1 „ „ 30 „ „

4 291 900
175 29
50 8
60 10

DEVELOPMENT TABLE FOR PLATES AND FILMS

PLATES	H. & D.	DISH *Ilford M.Q.* *Ilford Pyro Soda and Certinal Developer*			TANK *Ilford M.Q.* *Ilford Pyro Soda and Certinal Developer*		
		55°F.	65°F.	75°F.	55°F.	65°F.	75°F.
Ordinary	70	3	2	1½	6	4	3
Empress	100	3	2	1½	6	4	3
Special Rapid	270	4½	3	2	9	6	4
Zenith 400	400	7½	5	3½	15	10	6
Zenith 650	650	9	6	4	18	12	8
Portrait 400	400	15	10	6½	30	20	13
Auto-Filter	400	4¾	3¼	2¼	9¼	6½	4½
Rapid Chromatic	400	4½	3	2	9	6	4
Screened Chromatic	270	5¼	3½	2¼	10½	7	4¾
Chromatic	135	3¾	2¼	1¾	7½	4½	3
Press (Ortho)	700	6	4	3	12	8	6
Iso-Zenith	700	8¼	5½	3½	16½	11	7
Iso-Record	500	9½	6¼	4¼	18¾	12½	8½
Record	500	9½	6¼	4¼	18¾	12½	8½
Double-X-Press	1500	7½	5	3½	15	10	6½
Golden Iso-Zenith	1400	11	7½	5	22	15	10
Special Rapid Panchromatic	400	4½	3	2	9	6	4
Soft Gradation Panchromatic	700	8¼	5½	3½	16½	11	7
Hypersensitive Panchromatic	2500	11	7½	5	22	15	10
Infra-Red (with filter)	50	5¼	3½	2¼	10½	7	4½
FILMS							
Hyperchromatic	1500	7½	5	3½	15	10	6½
Portrait Ortho Fast	700	10½	7	4½	21	14	9½
Portrait Medium	350	7½	5	3½	15	10	6½
Commercial Ortho	250	6	4	3	12	8	6
Fine Grain Ordinary	45	3	2	1½	6	4	3
Selo Roll Film	650	7½	5	3½	15	10	6½
Selochrome Roll Film	1000	7½	5	3½	15	10	6½
Hypersensitive Panchromatic Roll Film and Film Pack	2000	6	4	3	12	8	6
Hypersensitive Panchromatic Flat Film	2000	6	4	3	12	8	6
Panchromatic Commercial	400	5¼	3½	2¼	10½	7	4½
Fine Grain Panchromatic Roll Film	1200	5¼	3½	2¼	10½	7	4½

NOTE.—The times given are *approximate* only and depend also on the subject, the lighting, and the printing paper to be used.

This table is not intended to apply to the developers used in the Photo-finishing trade, except at the concentrations given above.

DEVELOPERS FOR PLATES OR FILMS
FINE GRAIN DEVELOPER

FOR CINE FILM AND FILM FOR LEICA CAMERA, ETC. ID—11

Metol	20 grains		1 grm.
Sodium Sulphite (cryst.)	4 ozs.		100 grms
Hydroquinone	50 grains	or	2.5 ,,
Borax	20 ,,		1 ,,
Water up to	20 ozs.		500 c.cm.

Time of development from 10 minutes upwards according to the plate or film being developed.

ILFORD P.M.Q. D. & P. DEVELOPER FOR ROLL FILMS ID—6

Metol	1 oz.		25 grms.
Sodium Sulphite (cryst.)	$1\frac{3}{4}$ lbs.		700 ,,
*Sodium Bisulphite	1 lb.		400 ,,
Hydroquinone	$5\frac{1}{2}$ ozs.	or	135 ,,
Pyro	1 oz.		25 ,,
Sodium Carbonate (cryst.)	5 lbs.		2000 ,,
Potassium Bromide	50 grains		2 ,,
Water up to	10 gals.		40 litres.

Dissolve the chemicals in the order given in about seven gallons of warm water and make up to ten gallons with cold water.

The developer should be kept up to bulk by the addition, as required, of the strengthener diluted with an equal bulk of water.

STRENGTHENER.

Metol	$\frac{1}{2}$ oz.		12.5 grms.
Sodium Sulphite (cryst.)	$\frac{1}{2}$ lb.		200 ,,
*Sodium Bisulphite	$\frac{1}{4}$ lb.	or	100 ,,
Hydroquinone	$1\frac{1}{2}$ ozs.		37.5 ,,
Sodium Carbonate (cryst.)	$1\frac{1}{2}$ lbs.		600 ,,
Water up to	1 gal.		4 litres.

This developer is supplied in boxes to make 10, 20 and 40 gallons, including strengthener.

ILFORD M.Q. D. & P. DEVELOPER FOR ROLL FILMS ID—34

Metol	1 oz.		25 grms.
Sodium Sulphite (cryst.)	2 lbs.		800 ,,
*Sodium Bisulphite	4 ozs.		100 ,,
Hydroquinone	5 ozs.	or	12.5 ,,
Sodium Carbonate (cryst.)	$2\frac{1}{2}$ lbs.		1000 ,,
Potassium Bromide	$\frac{1}{2}$ oz.		12.5 ,,
Water up to	10 gals.		40 litres.

STRENGTHENER.

Metol	$\frac{1}{2}$ oz.		12.5 grms.
Sodium Sulphite (cryst.)	$6\frac{1}{4}$,,		156 ,,
*Sodium Bisulphite	$\frac{3}{4}$,,	or	18.5 ,,
Hydroquinone	$\frac{1}{2}$,,		12.5 ,,
Sodium Carbonate (cryst.)	$\frac{1}{2}$ lb.		200 ,,
Water up to	1 gal.		4 litres.

**An equal weight of Potassium Metabisulphite may be substituted for the Sodium Bisulphite if desired.*

X-RAY DEVELOPER ID—19

DEVELOPER FOR DISH OR TANK.

Metol	80 grains	or	4 grms.
Sodium Sulphite (cryst.) ..	12 ozs.		300 ,,
Hydroquinone	320 grains		16 ,,
Sodium Carbonate (cryst.) ..	8 ozs.		200 ,,
Potassium Bromide	200 grains		10 ,,
Water up to	80 ozs.		2000 c.cm.

Wash for one minute before fixing.

This developer is supplied in tins to make ½, 1 and 2 gallons.

OSCILLOGRAPH DEVELOPER ID—33

Metol	100 grains	or	5 grms.
Sodium Sulphite (cryst.) ..	4 ozs.		100 ,,
Hydroquinone	160 grains		8 ,,
Sodium Carbonate (cryst.) ..	4 ozs.		100 ,,
Potassium Bromide	100 grains		5 ,,
Water up to	40 ozs.		1000 c.cm.

Time of development 5—10 minutes.

DEVELOPERS FOR PHOTOMECHANICAL WORK

HYDROQUINONE DEVELOPER.

DEVELOPER FOR SCREEN OR LINE NEGATIVES OR POSITIVES ID—13

A

Hydroquinone	1 oz.	or	25 grms.
Potassium Metabisulphite ..	1 ,,		25 ,,
Potassium Bromide	1 ,,		25 ,,
Water up to	40 ozs.		1000 c.cm.

B

Potassium Hydrate (stick) ..	2 ozs.	or	50 grms.
Water up to	40 ,,		1000 c.cm.

For use mix equal parts of A and B.

With normal exposure development should be complete in about 2 minutes.

DEVELOPER FOR CONTINUOUS TONE NEGATIVES AND POSITIVES ID—2

Metol	40 grains	or	2 grms.
Sodium Sulphite (cryst.) ..	6 ozs.		150 ,,
Hydroquinone	160 grains		8 ,,
Sodium Carbonate (cryst.) ..	4 ozs.		100 ,,
Potassium Bromide	40 grains		2 ,,
Water up to	40 ozs.		1000 c.cm.

For use dilute 1 part of the above with 2 parts of water. Time of development 3–6 minutes according to the contrast required.

DEVELOPERS FOR PHOTOMECHANICAL WORK

Metol	30 grains	or	1.5 grms.
Sodium Sulphite (cryst.)	6 ozs.		150 ,,
Hydroquinone	½ oz.		12.5 ,,
Sodium Carbonate (cryst.)	4 ozs.		100 ,,
Potassium Bromide	40 grains		2 ,,
Water up to	40 ozs.		1000 c.cm.

METOL HYDRO-QUINONE CONTRAST DEVELOPER ID—14

Use at above strength. Time of development 2–4 minutes according to contrast required.

Metol	60 grains	or	3 grms.
Sodium Sulphite (cryst.)	1¾ ozs.		40 ,,
Sodium Carbonate (cryst.)	2 ozs.		50 ,,
Potassium Bromide	10 grains		0.5 ,,
Water up to	40 ozs.		1000 c.cm.

METOL DEVELOPER FOR SOFT NEGATIVES AND POSITIVES ID—15

For use dilute with an equal volume of water.

Expose fully and develop for 2–6 minutes according to contrast required.

A.

Hydroquinone	3 ozs.	or	75 grms.
Sodium Sulphite (anhyd.)	7½ ,,		188 ,,
Potassium Bromide	¾ oz.		18 ,,
Water up to	80 ozs.		2000 c.cm.

B.

Potassium Carbonate (anhyd.)	10 ozs.	or	250 grms.
Water up to	80 ,,		2000 c.cm.

HYDRO-QUINONE CARBONATE DEVELOPER ID—35

For use take equal parts of A and B.

INTENSIFICATION

BLEACHING SOLUTION.

Mercuric Chloride (corrosive sublimate)	100 grains	or	6 grms.
Ammonium Chloride	100 grains		6 ,,
Water up to	10 ozs.		250 c.cm.

INTENSIFI-CATION BLEACHING WITH MERCURY AND SUBSEQUENT BLACKENING

The negative, *after thorough washing*, is immersed in this solution until the image is white throughout. If not perfectly free from hypo, indelible stains may appear. Wash well in running water and then blacken in one of the following solutions according to the degree of intensification desired.

(*a*) Any plate developer.
(*b*) A solution of sodium sulphite, 1 part in 5 of water.
(*c*) Very dilute ammonia, 1 part ammonia sp. gr. .880 to 100 parts of water.

INTENSIFICATION

MERCURIC IODIDE INTENSIFIER

Mercuric Iodide	.. ..	45 grains	2.5 grms.
Sodium Sulphite	.. ..	2 ozs.	or 50 ,,
Water up to	.. ..	10 ozs.	250 c.cm.

Dissolve the sodium sulphite in the water and then add the mercuric iodide. To ensure permanence the negative after intensification is washed, and then treated with any plate developer for a few minutes.

CHROMIUM INTENSIFIER

This is simple to work, not liable to produce stains and gives satisfactory results.

BICHROMATE STOCK SOLUTION.

Potassium Bichromate	..	1 oz.	25 grms.
Water up to	.. ..	10 ozs.	or 250 c.cm.

This solution keeps indefinitely.

BLEACHING SOLUTION A.

Bichromate Stock Solution		½ oz.	12.5 c.cm.
Hydrochloric Acid (conc.)		5 minims	or 0.3 ,,
Water up to	.. ..	5 ozs.	125 ,,

BLEACHING SOLUTION B.

Bichromate Stock Solution		½ oz.	12.5 c.cm.
Hydrochloric Acid (conc.)		25 minims	or 1.5 ,,
Water up to	.. ..	5 ozs.	125 ,,

The bleaching solution should be freshly made. Solution A gives more intensification than Solution B. Immerse the washed negative in one of these solutions until it is entirely bleached, then wash until the yellow stain is removed from the film, and develop, by daylight or after exposure to daylight, with a negative developer.

Thorough washing is necessary after intensification by any process.

REDUCTION

FERRICYANIDE OR FARMER'S REDUCER

Increases contrast by reducing density in shadows much more than in highlights.

Potassium Ferricyanide	..	50 grains	2.5 grms.
Water up to	.. ..	1 oz.	or 25 c.cm.

A fresh plain 20% solution of Hypo is used and sufficient Ferricyanide solution added to colour the Hypo pale yellow. The energy of the reduction is proportional to the amount of Ferricyanide present and the process of reduction should be closely watched. Thorough washing is all that is required afterwards.

REDUCTION

PERSULPHATE REDUCER

Decreases contrast, acting first on the dense highlights.

Ammonium Persulphate ..	¼ oz	or	6 grms.
Water up to	10 ozs.		250 c.cm.

One or two drops of Sulphuric Acid should be added to induce regularity of action.

PROPORTIONAL REDUCER

Acts proportionately on the densities of the negative.

A

Potassium Permanganate ..	2 grains	or	0.12 grm.
Sulphuric Acid (conc.) ..	13 minims		0.75 c.cm.
Water up to	20 ozs.		500 ,,

B

Ammonium Persulphate ..	½ oz.	or	12.5 grms.
Water up to	20 ozs.		500 c.cm.

For use mix one part of A with three parts of B.

HEAVY DEVELOPER STAIN

Can be removed by the following solution :—

Potassium Permanganate ..	50 grains	or	3 grms.
Common Salt	¼ oz.		6.5 ,,
Acetic Acid Glacial	1 oz.		25 c.cm.
Water	20 ozs.		500 ,,

The negative is immersed for ten minutes with constant rocking, rinsed and soaked in a solution of Potassium Metabisulphite 5% until free from colouration. It is then redeveloped with an ordinary non-staining developer.

FIXING, HARDENING, ETC., FOR PLATES AND FILMS

ACID FIXING BATH

Sodium Hyposulphite ..	1 lb.	or	400 grms.
Potassium Metabisulphite ..	1 oz.		25 ,,
Water	40 ozs.		1000 c.cm.

COMBINED FIXING AND HARDENING BATH

Sodium Hyposulphite ..	¾ lb.	or	300 grms.
Potassium Metabisulphite ..	1 oz.		25 ,,
Chrome Alum	½ oz.		12.5 ,,
Water	40 ozs.		1000 c.cm.

The Hypo and the Metabisulphite are dissolved in 30 ozs. of hot water and allowed to cool. The Chrome Alum is then dissolved in 10 ozs. of warm water and added to the remainder of the bath when cool.

FIXING, HARDENING, ETC., FOR PLATES AND FILMS

HARDENING BEFORE DEVELOPMENT

When high temperatures are prevailing use Ilford Tropical Hardener, for temperatures up to 90°F. dilute one part of Hardener with seven parts of water. For temperatures above 90°F. dilute one part of Hardener with four parts of water. Allow plate or film to remain three minutes in the solution, and then pass to the Developer.

FORMALIN HARDENER

1 Part 40% Formaldehyde to 100 parts water. This can be used either before or after fixation but should not be used before development.

HYPO-ELIMINATOR

Thorough washing in water is the only perfect Hypo-eliminator. Of other methods, Potassium Permanganate is the most satisfactory. A pink solution of the permanganate is used and the plate or film is flooded with the solution in a dish. As soon as the pink colour disappears, replace the liquid with fresh permanganate solution and continue the process until the pink colour remains and is not discharged in one minute. The plate or film after rinsing is now ready for drying.

RAPID DRYING

Soak a few minutes in industrial methylated spirits which has been diluted with one-fifth the bulk of water, and then dry in a strong current of warm air. This method is not applicable to film coated on safety (cellulose acetate) base.

DESENSITIZATION

The best method is to use Ilford Desensitol as a preliminary bath before development.

Desensitol	.. .. ..	10 minims	or 1 c.cm.
Water	.. .. ..	1 oz.	or 50 „

Bathe the plate or film for one minute in absolute darkness. Then develop in weak light or with the aid of Ilford Bright Green Safelight. A Red Safelight is not desirable.

ILFORD SPECIAL LANTERN PLATE ID—16

Hydroquinone Developer.

Specially for black tones.

A.

Hydroquinone	160 grains	or	9 grms.
Sodium Sulphite (cryst.) ..	2 ozs.		50 ,,
Water up to	20 ,,		500 c.cm.

B.

Caustic Soda (stick)	90 grains	or	5 grms.
Potassium Bromide	35 ,,		2 ,,
Water up to	20 ozs.		500 c.cm.

For use, mix equal parts of A and B.

With this developer the image of a properly exposed plate should appear in about half a minute and development should be complete in about 2½ minutes.

ILFORD "WARM BLACK" LANTERN PLATE ID—17

Metol-Hydroquinone Developer.

For Warm Black Tones.

Metol	10 grains	or	.6 grm.
Sodium Sulphite (cryst.) ..	½ oz.		12.5 grms.
Hydroquinone	30 grains		1.5 ,,
Sodium Carbonate (cryst.) ..	½ oz.		12.5 ,,
Potassium Bromide	30 grains		1.5 ,,
Water up to	20 ozs.		500 c.cm.

Development should be complete in about 1½ minutes.

Colder or warmer tones can be obtained by considerably reducing or increasing the amount of Potassium Bromide.

ILFORD GASLIGHT LANTERN PLATE ID—29

Metol-Hydroquinone Developer.

Metol	15 grains	or	0.75 grm.
Sodium Sulphite (cryst.) ..	1 oz.		25 grms.
Hydroquinone	60 grains		3 ,,
Sodium Carbonate (cryst.) ..	1½ ozs.		40 ,,
Potassium Bromide, 10% solution (Pot. Brom. 1 oz., Water to 10 ozs.)	1 dram		3 c.cm.
water up to	20 ozs.		500 ,,

ILFORD "ALPHA" LANTERN PLATES

EXPOSURE

CONTACT.—("Alpha" plates are not suitable for slide-making by reduction.) Approximate exposures with a negative of average density at 6 inches (15 cm.) from the source of light would be as follows :—

Tone.	Duplex Paraffin Seconds.	Incandescent Gas Seconds.	20 W. Electric Seconds.	Approximate times of development at 65°F. Minutes.
For Red ..	60	12	24	3
„ Red Brown	50	10	20	4
„ Brown ..	40	8	16	5
„ Sepia ..	30	6	12	6
„ Cool Sepia	20	4	8	7½
„ Greenish-Black ..	10	2	4	10

DEVELOPING

This is carried out in the same way as for "Special" lantern plates, except for one important difference, that the only suitable developer is the following :—

"ALPHA" DEVELOPER ID—18

A.

Hydroquinone	100 grains	6 grms.
Sodium Sulphite (cryst.) ..	1 oz.	or 25 „
Water up to	20 ozs.	500 c.cm.

B.

Sodium Carbonate (cryst.) ..	1¼ ozs.	30 grms.
Potassium Bromide	35 grains	or 2 „
Water up to	20 ozs.	500 c.cm.

For use, mix equal parts of A and B.

Caustic Soda (stick) 35 grains (2 grms.) may be used instead of Sodium Carbonate.

The developer being necessarily weak, development takes longer than for "Special" lantern plates. The image should appear slowly, and the development time will depend upon the colour of image desired, as shown in the above table.

BROMIDE PAPERS

EXPOSURE

Approximate exposures for contact work with a negative of average density at 48 inches (1.2 metres) from the source of light in each case.

20 w. Electric, 8 seconds. Incandescent Gas, 4 seconds. To obtain uniform results, exposures must be made under uniform conditions as to light and distance.

METOL HYDROQUINONE ID—20

METOL-HYDROQUINONE.

Metol	15 grains	or	0.75 grm.
Sodium Sulphite (cryst.)	1 oz.		25 grms.
Hydroquinone	60 grains		3 „
Sodium Carbonate (cryst.)	1½ ozs.		40 „
Potassium Bromide	20 grains		1 grm.
Water up to	20 ozs.		500 c.cm.

For use dilute one part with one part of water.

AMIDOL DEVELOPER ID—22

AMIDOL.

Sodium Sulphite (cryst.)	1 oz.	or	25 grms.
Amidol	60 grains		3 „
Potassium Bromide (10% solution)	80 mins.		4 c.cm.
Water up to	20 ozs.		500 „

Development with the above developers should be complete in about 2 minutes. After development rinse and transfer to the fixing bath.

PRESS BROMIDE DEVELOPER ID—21

PRESS BROMIDE DEVELOPER.

Metol	60 grains	or	3 grms.
Sodium Sulphite (cryst.)	4 ozs.		100 „
Hydroquinone	½ oz.		12.5 „
Sodium Carbonate (cryst.)	7 ozs.		175 „
Potassium Bromide	½ oz.		12.5 „
Water up to	80 ozs.		2000 c.cm.

This developer is used at the above strength. Development time about one minute.

CLEARING SOLUTION

To remove yellow developer stain from Bromide prints.

Alum, saturated solution	10 ozs.	or	250 c.cm.
Hydrochloric Acid (conc.)	½ oz.		6 „

REDUCER

STOCK IODINE SOLUTION.

Potassium Iodide	½ oz.	or	6 grms.
Iodine	20 grains		1 grm.
Water up to	10 ozs.		250 c.cm.

STOCK CYANIDE SOLUTION.

Potassium Cyanide	40 grains	or	2 grms.
Water up to	10 ozs.		250 c.cm.

N.B. Potassium Cyanide is a very strong poison and must be used with extreme care.

For use take one ounce (25 c.cm.) of each stock solution and make up to 20 ounces (500 c.cm.) with water.

FIXING BATH

Sodium Hyposulphite	..	4 ozs.	or 100 grms.
Potassium Metabisulphite	..	½ oz.	or 12.5 „
Water	..	20 ozs.	or 500 c.cm.

SULPHIDE TONING

STOCK FERRICYANIDE SOLUTION.

Potassium Ferricyanide	..	1 oz.	or 25 grms.
Potassium Bromide ..	..	1 „	or 25 „
Water up to ..	..	10 ozs.	or 250 c.cm.

For use take 1 oz. (25 c.cm.) and make up to 10 ozs. (250 c.cm.) with water.

STOCK SULPHIDE SOLUTION.

Sodium Sulphide	..	½ oz.	or 12.5 grms.
Water up to ..	..	10 ozs.	or 250 c.cm.

For use take 1 oz. (25 c.cm.) and make up to 10 ozs. (250 c.cm.) with water.

Prints should be fully developed out. After the print is fixed and thoroughly washed, immerse in the Ferricyanide Solution until the image is bleached. Then wash for ten minutes and place in the Sulphide Solution, in which it will acquire a rich sepia colour. Finally wash for half an hour.

HYPO-ALUM TONING

Prints by this process yield a purplish Sepia. They are toned in a hot mixture of Hypo Alum, etc., as follows :—

Hot Water	..	80 ozs.	or 2000 c.cm.
Hypo ..	..	12 ozs.	or 300 grms.

Dissolve and then add a little at a time :—

Alum	..	2 ozs.	or 50 grms.

This bath requires " ripening " as, when new, it has a reducing action on any prints toned in it ; this is best done by passing some waste prints through the bath or by adding silver nitrate 5 grains (0.25 grm.) dissolved in a little water to which is added just sufficient strong ammonia, drop by drop, to redissolve the precipitate formed. This toning bath will last for years and will considerably improve on keeping ; it should be kept up to bulk by the addition of freshly made solution.

The prints (which should be little further developed than for black and white prints) are toned in this bath at about 120°F. (50°C.). At this temperature prints will tone in about ten minutes. A lower temperature is not recommended as toning is unduly prolonged ; higher temperatures give colder tones.

Finally, wash the prints thoroughly and swab over with a tuft of cotton wool before drying.

Rather warmer tones are obtained by adding Potassium Iodide 40 grains (2 grms.) to the toning bath.

BROMIDE PAPERS

RED TONES

Prints should be toned by the Sulphide or Hypo-Alum method, and then in a Gold Toning Bath, as follows :—

Ammonium Sulphocyanide ..	30 grains	or	2 grms.
Gold Chloride	2 grains		0.1 ,,
Water up to	4 ozs.		100 c.cm.

After toning for ten minutes in this bath the desired tone should be obtained.

The prints are then refixed in 10 per cent. Hypo Solution for five to ten minutes and then given a good wash in running water.

GREEN TONES

Green tones are not generally quite so satisfactory as the other colours, but fairly good tones are obtained with the toning solutions supplied by chemical firms, such as Johnson's " Pactum " Green Toner.

BLUE TONES

FERRICYANIDE SOLUTION.

Potassium Ferricyanide ..	20 grains	or	1 grm.
Sulphuric Acid (conc.) ..	40 mins.		2 c.cm.
Water	20 ozs.		500 ,,

Dissolve the salt in the water and then add the acid slowly.

IRON SOLUTION.

Ferric Ammonium Citrate ..	20 grains	or	1 grm.
Sulphuric Acid (conc.) ..	40 mins.		2 c.cm.
Water	20 ozs.		500 ,,

Dissolve the salt in the water and then add the acid slowly. For use mix the solutions in equal parts just before use.

The prints, which should be a little lighter than they are intended to be when finished, must have been thoroughly washed after fixing. They should be immersed in the toning solution until the desired tone is obtained and then washed until the yellow stain disappears from the whites. Bleaching of the blue image, which may occur on washing, may be prevented by washing in very slightly acidulated water.

BROMOIL BLEACHER

Copper Sulphate	2 ozs.	or	50 grms.
Potassium Bromide	2 ,,		50 ,,
Potassium Bichromate ..	50 grains		2.5 ,,
Sulphuric Acid (conc.) ..	40 mins.		2 c.cm.
Water up to	20 ozs.		500 ,,

Dilute with three or four parts of water for use. Bleaching should be complete in about three minutes.

GASLIGHT PAPERS

GASLIGHT PAPER DEVELOPER ID—36

METOL-HYDROQUINONE DEVELOPER.

Metol	56 grains	or	3 grms.
Sodium Sulphite (cryst.) ..	4 ozs.		100 ,,
Hydroquinone	½ oz.		12.5 ,,
Sodium Carbonate (cryst.) ..	7½ ozs.		187.5 ,,
Potassium Bromide	16 grains		0.75 ,,
Water up to	80 ozs.		2000 c.cm.

Gaslight Prints should be developed in about half a minute; then rinsed, fixed and washed as for Bromide paper.

This developer is obtainable in packets under the name of Selo M.Q. Developer, and also in bulk quantities in tins.

AMIDOL DEVELOPER ID—30

AMIDOL DEVELOPER.

Sodium Sulphite (cryst.) ..	1 oz.	or	25 grms.
Amidol	60 grains		3 ,,
Potassium Bromide 10% (sol.)	20 minims		1 c.cm.
Water up to	20 ozs.		500 c.cm.

CERTINAL DEVELOPER

CERTINAL DEVELOPER.

Certinal	32 minims	or	2 c.cm.
Water	1 oz.		30 ,,

ACID HARDENING AND FIXING BATH FOR GASLIGHT D. & P.

Sodium Hyposulphite ..	1 lb.	or	400 grms.
Stock Hardening Solution ..	10 ozs.		250 c.cm.
Water up to	80 ozs.		2000 ,,

STOCK HARDENING SOLUTION.

Sodium Sulphite (cryst.) ..	8 ozs.	or	2000 grms.
Glacial Acetic Acid ..	6 ozs.		150 c.cm.
Potash Alum (powdered) ..	8 ozs.		200 grms.
Water up to	80 ozs.		2000 c.cm.

Dissolve the Sulphite in 16 ozs. (400 c.cm.) of warm water and allow to cool. Then add the Acetic Acid slowly stirring all the time. Dissolve the Alum in 48 ozs. (1200 c.cm.) of hot water, allow to cool and then add to the Acid Sulphite mixture. Care must be taken that all mixing be done at a temperature below 70°F. (21°C.).

ILFORD CLORONA PAPER

METOL HYDROQUINONE DEVELOPER ID—25

METOL-HYDROQUINONE DEVELOPER.

Metol	10 grains	or	0.5 grms.
Sodium Sulphite (crystals) ..	½ oz.		12.5 ,,
Hydroquinone	30 grains		1.5 ,,
Sodium Carbonate (cryst.) ..	½ oz.		12.5 ,,
Potassium Bromide (solid) ..	30 grains		1.5 ,,
Water up to	20 ozs.		500 c.cm.

Development should be complete in about 1½ minutes.

ILFORD CLORONA PAPER

CHLORQUINOL M.Q. DEVELOPER.

CHLORQUINOL M.Q. DEVELOPER ID—23

Metol	10 grains		0.5 grms.
Chlorquinol (or Adurol) ..	¼ oz.		6.2 ,,
Hydroquinone	¼ ,,		6.2 ,,
Sodium Sulphite (cryst.) ..	4 ozs.	or	100 ,,
Sodium Carbonate (cryst.)	4 ,,		100 ,,
Potassium Bromide ..	15 grains		0.8 ,,
Water up to	80 ozs.		2000 c.cm.

Development should be completed in about 1½ minutes.

One part of this developer mixed with three parts of water gives a Warm Black colour in about three minutes. More exposure and dilution with six parts of water gives a Sepia in about the same time.

Colder or Warmer Tones may be obtained by considerably reducing or increasing the amount of Potassium Bromide.

This developer is obtainable as Ilford Clorona Developer, in packets to make 40 ozs. and in tins to make 320 ozs. of solution.

CHLORQUINOL HYDRO-QUINONE DEVELOPER ID—24

To obtain Warm Black to Bright Red Tones on Clorona Paper, the formula given below should be used, variation of tone being obtained by variation of bromide content, strength of developer and time of development, the exposure being varied to give the desired depth of print under the development conditions in use :—

Chlorquinol (or Adurol) ..	60 grains		3.4 grms.
Hydroquinone	60 ,,		3.4 ,,
Sodium Sulphite (cryst.) ..	2½ ozs.		62.5 ,,
Sodium Carbonate (cryst.) ..	2½ ,,	or	62.5 ,,
Potassium Bromide	6 grains		0.3 ,,
Water up to	20 ozs.		500 c.cm.

Colour.	Approximate Exposure.	Dilution of Developer.	Extra 10% Pot. Bromide Sol. per 1 oz. (25 c.cm.) of Stock Developer.	Approx. Times of Development.
	Times.	*Times.*		*Minutes.*
1. Warm Black	Normal.	Full Str'gth	None.	1½
2. Sepia ..	3	10	20 min's 1 c.cm.	5
3. Brown Sepia	5	15	60 ,, 3 ,,	10
4. Red Brown	6	25	100 ,, 5 ,,	15
5. Red ..	7	30	120 ,, 6 ,,	20

By normal exposure is meant the correct exposure for obtaining the best possible warm black print that is obtainable from a given negative in full strength developer.

Prints of a warm tone dry colder and darker than they appear when wet.

PRINTING OUT PAPERS

P.O.P.

Wash the prints well until all milkiness disappears from the wash water, then tone in the following toning bath.

Ammonium Sulphocyanide	20 grains	or	1 grm.
Stock Gold Solution ..	2 ozs.		50 c.cm.
Water up to	20 ozs.		500 c.cm.

The Stock Gold solution contains 15 grains (1 grm.) Gold Chloride in 20 ozs. (500 c.cm.) water.

When prints are toned wash, fix for 10 minutes and finally wash well.

FIXING SOLUTION.

Sodium Hyposulphite	3 ozs.	or	75 grms.
Water up to	20 ozs.		500 c.cm.

SELF TONING PAPERS

ENITONE

Gelatine Self-toning papers require fixing only. Prints are put direct into the fixing bath without previous washing, fixed for 5-10 minutes and then well washed.

FIXING SOLUTION.

Sodium Hyposulphite ..	6 ozs.	or	150 grms.
Water up to	20 „		500 c.cm.

SELTONA

Collodion Self-Toning Paper and Tintona. Wash prints for 5 minutes and then fix for 10 minutes, and wash well.

FIXING SOLUTION.

Sodium Hyposulphite.. ..	2 ozs.	or	50 grms.
Water	20 „		500 c.cm.

For cold tones immerse prints in a 10% solution of common salt before fixing without preliminary washing.

PAPERS for PHOTOMECHANICAL WORK

PHOTO-MECHANICAL AND STRIPPING PAPER

Develop in Metol-Hydroquinone developer given for Gaslight Paper on page 16. Development should be complete in one minute. It is important that the acid fixing bath given on page 14, should be used.

To render Photomechanical and other papers more translucent soak in, or sponge with, a white mineral oil such as is used for lubricating typewriters, then thoroughly wipe off surplus.

DRY TRANSFER PAPER

Develop in any of the developers for Bromide Paper, given on page 13. Fix, wash, transfer to final support and when dry then strip.

It is an advantage to use the following fixing and hardening bath for this paper.

Sodium Hyposulphite	..	½ lb.	or	200 grms.
Potassium Metabisulphite	..	1 oz.		25 „
Chrome Alum	.. ..	¼ „		6 „
Water	.. .. ..	40 ozs.		1000 c.cm.

The method of preparing the bath is given at the bottom of page 9.

ADHESIVES FOR DRY TRANSFER PAPER

For wood or paper use 2%–3% solution of gelatine.

For glass, metal or similar hard surfaces use weak Fish Glue or Seccotine thinned with water.

Booklets giving full details of the above papers will be supplied on request.

ILFORD COLOUR FILTERS

The following list comprises the filters most commonly used. Filters of other colours and depths can, however, be supplied to order for special purposes.

(A) FILTERS FOR LANDSCAPE AND GENERAL PHOTOGRAPHY

Alpha (Yellow 104), for use with Ilford Panchromatic Plates and Films. Increase of exposure 1½ to 2 times. Gives sufficient correction for blues and greens in landscape work generally. This filter may also be used with Chromatic and Rapid Chromatic Plates giving slightly less correction than the Iso Filter, but only requiring an increase of exposure 3 times; with the Screened Chromatic Plate and Selochrome Film, increase of exposure 2½ times; with the Auto-Filter and Iso-Zenith plates and Selo Roll Films, the increase of exposure is 3 times. **This filter can also be supplied in the form of a sky filter** (814).

Beta (Green 401), for use with Ilford Panchromatic Plates and Films. Increase of exposure 3 times. Gives fairly good correction for all colours with minimum increase of exposure. It is suitable for near foreground subjects in which there is much red and yellow; it may also be used to give an approximately correct result in copying coloured pictures and in the photography of coloured objects where the exposure necessitated by the Gamma Filter would be too long.

Gamma (Green 402), for use with Ilford Panchromatic Plates and Films. Increase of exposure 4 times. It is designed to give as perfect correction for all colours as possible. Its principal use is in copying coloured pictures, in the photography of coloured objects, stained glass windows, etc., and for obtaining the grey printer in 4-colour process work.

ILFORD COLOUR FILTERS

(A) FILTERS FOR LANDSCAPE AND GENERAL PHOTOGRAPHY *(Contd.)*

Delta (Yellow 109), for use with Ilford Panchromatic Plates and Films. Increase of exposure 4 times, giving a very strong rendering of clouds where over-correction of the foreground is permissible. (It should be noted that the Alpha Filter is sufficient to give excellent cloud rendering in ordinary landscapes.) This filter is somewhat deeper in colour than the Iso Filter.

Iso (Yellow 105), for use with Ilford Chromatic and Rapid Chromatic Plates, Selochrome Film and Commercial Ortho Film. Increase of exposure 4 to 5 times. Giving the maximum correction of blues and greens in landscapes when using these plates. **This filter can also be supplied in the form of a sky filter (815).**

Aviol (Yellow 102), absorbs the whole of the ultra-violet and a little of the extreme visible violet. It is useful for cutting haze in aerial photography and such cases. Increase of exposure $1\frac{2}{3}$ with Ilford Panchromatic Plates and Films, about 3 with Ilford Chromatic and Rapid Chromatic Plates, and 5 with non-colour-sensitive plates.

H.W. (Green 403). For use with Ilford Panchromatic Plates and Films giving daylight colour correction with incandescent electric illumination. Increase of exposure 6 times. If a negative is taken through this filter of a subject illuminated by metal filament lamps (or half-watt lamps), the result will be approximately the same as if it were taken through a Gamma Filter with daylight illumination.

(B) FILTERS FOR PHOTOMICROGRAPHY

Micro Filters (M) 1—9. These filters are designed to enable the Microscopist using Ilford Panchromatic Plates and Films to control his contrasts in the photomicrography of stained sections. They are also useful in other branches of photography where colour values have to be falsified or exaggerated in any direction; thus Micro No. 5 (Orange 202) which is also frequently termed "Furniture Red," gives a rich rendering of the grain of many polished woods. In photomicrography these filters may be used in pairs, if so desired. Exposure factors cannot be given here, as they depend upon the illuminant used, but further information is given in "Panchromatism" (price 8d., post free, on application).

(C) FILTERS FOR THREE-COLOUR AND GENERAL PROCESS WORK

Tri-colour Red (204) **Tri-colour Green** (404) and **Tri-colour Blue** (304). The increases of exposure for these filters are given in the instructions packed with the various Panchromatic materials.

Complementary Filters. Minus Red (Blue 302), Minus Green (Magenta 503), Minus Blue (Yellow 110), are complementary to the Tri-colour Set. They are of value in the examination of inks for three-colour work.

"Q" Filter (805). No increase of exposure necessary with Ilford Panchromatic Plates and Films. The increase of exposure with non-colour-sensitive plates is $1\frac{1}{2}$ times. This filter is intended principally for use as an absorber of ultra-violet light in process work; its ultra-violet absorption is complete and it is far less liable to deteriorate than the earlier Aesculin filter, which it has largely replaced. It is also used to some extent in landscape photography in mountainous and snowy districts, where ultra-violet light is excessive.

(D) FILTERS FOR SCIENTIFIC WORK GENERALLY

Spectrum Filters (601-608). A set of eight filters each transmitting approximately one-eighth of the visible spectrum. They are extremely useful for the analysis of colours and the examination of colour filters. They cannot be supplied in gelatine film form.

Infra-Red Filter (Red 207). Transmits the near infra-red from wave length about 7,000 A.U. onwards. With ordinary Panchromatic Plates this filter necessitates an increase of exposure of 6,000—17,000 and its possible use is therefore very restricted. When used, however, with the Ilford Infra-Red Plate the necessary exposure is reasonably short and the combination, Infra-Red Plate with Infra-Red Filter, has an effective speed of about 100 H. and D. to Daylight, and 500 H. and D. to half-watt light.

Mercury Filters. Mercury Yellow (808). Mercury Green (807), Mercury Violet (806). Each of these filters transmits one only of the three groups of characteristic lines of the mercury vapour lamp spectrum; used with this lamp they, therefore, afford a choice of three practically monochromatic lights.

Astra Filter (Green 406). A new filter designed for visual and photographic use with refracting telescopes. It eliminates as much of the secondary spectrum as is possible without unduly lengthening the exposure.

ILFORD DARKROOM SAFELIGHTS

Ilford Darkroom Safelights are distinguished from other "safelights" by their diffusing screen, which is remarkable for its high diffusing power and its small absorption of light.

"S" (902) — For use when working with slow non-colour-sensitive plates or films, Lantern Plates, and Bromide Paper.

"F" (904) — For use with non-colour-sensitive Plates and Films.

"X" (905) — This safelight is olive-green in colour and is very pleasant to work by. It has been specially designed for use with Ilford Double-Coated X-ray Films for which it has a somewhat higher degree of safety, for the same luminosity, than the "F" safelight. Must not be used for orthochromatic or colour sensitive materials.

"ISO" (906) — For use with Chromatic, Orthochromatic, and Isochromatic Plates and Films.

"G" (907) — Deep Bluish Green—this safelight is produced to meet the demand of some workers who dislike attempting to work in absolute darkness and others who prefer a Green light to a deep Ruby light. Very special care, however, is necessary in handling Ilford Panchromatic Plates and even Films by so weak a light as is passed by this safelight.

"G.B." (908) — Greenish Blue—improved safelight for Panchromatic Plates and Films. Considerably safer and more suitable for use with the faster emulsions.

"BRIGHT GREEN" (909) — This addition to the series of darkroom safelights has been made for the assistance of those who wish to desensitize their Panchromatic Plates and Films before developing them. The use of this safelight enables the development of a Panchromatic or other Plate or Film, after desensitizing, to be carried out with perfect safety and convenience.

"INFRA-RED" (903) — Ordinary Safelights are quite unsuitable for use with Infra-Red plates and films. This safelight has been produced specially for these materials and gives a pleasant yellow-green illumination in which they can be handled with safety.

BOTTLED AND PACKED CHEMICALS

Substance.	*Size.*	*Packing.*
Metol	1 oz.	Bottle
„	8 „	„
„	16 „	„
Hydroquinone	1 „	„
„	8 „	„
„	16 „	„
Sodium Sulphite (cryst.)	4 lb.	Tin
„ „ „	28 „	„
„ „ (Anhydrous)	1 „	„
Sodium Carbonate (cryst.)	2 „	„
„ „ „	14 „	„
„ „ (Anhydrous)	1 „	„
Potassium Bromide	1 oz.	Bottle
„ „	8 „	„
„ „	16 „	„
Potassium Metabisulphite	8 „	Tin
„ „	16 „	„
*Sodium Sulphide and Sodium Hydroxide	3 „	Bottle

*For recovery of Silver from used Hypo.

DEVELOPING AND FIXING POWDERS, ETC

CERTINAL.—Ilford Concentrated Liquid Developer (contains no Metol). Requires dilution with water only, for use with Ilford Plates, Papers and Films.

3 oz. Bottle; 10 oz. Bottle; 20 oz. Bottle.

Ilford Professional Developer for Plates, Papers and Films.
In tins sufficient to make 400 ozs. Tank Developer.

Ilford Clorona Developer for the development of Warm Tone Papers.

In packets to make 40 ozs. of solution.
In tins to make 320 ozs. of solution.

Selo Gaslight Developer, Universal M.Q. Developer for Plates, Films and Papers.

Per packet, 3d.; Per Carton of 6 packets, 1s. 6d.
For bulk quantities see next page.

Ilford Acid Hypo Fixing Salts for Plates, Films and Papers.
In tins of ½ lb., 2½ lb. and 5 lb.

ILFORD CHEMICALS

CHEMICALS FOR THE PHOTO-FINISHING TRADE

Ilford P.M.Q. Roll Film Tank Developer.

Pyro-Metol-Hydroquinone tank developer for Roll Films in boxes to make 10, 20 and 40 gallons, including strengthener. Quantities for other size tanks to order.

Selo Gaslight Developer in tins to make ½ gallon, also 2, 5 and 10 gallons of stock solution. These are numbered 1, 2, 3 and 4 respectively.

Ilford X-Ray Developer.

In tins to make ½ gallon, 1 gallon and 2 gallons.

Ilford X-Ray Developer formula in packets for Dental Work to make 12 ozs. solution in boxes of 6 packets.

ILFORD BOOKLETS

ILFORD BOOKLETS

Selo Films for Perfect Pictures.

Panchromatism. New and revised edition with colour test chart, price 6d. Post Free 8d. in U.K.

Ilford Plates and Films.

Ilford Colour Filters, Holders, Wedge Screens and Safelights.

Ilford X-Ray Accessories Catalogue.

The Use and Care of Ilford Intensifying Screens for X-Ray Work.

Ilford Fluorazure Intensifying Screens.

The Making of Slides and Transparencies on Ilford Lantern Plates.

Ilford Bromide and Clorona Papers and how to use them.

Ilford Exposure Tables.

Seltona Booklet.

Selo Reversal 16 m.m. (Safety) Cine Film.

Photography as an Aid to Scientific Work.

Infra-Red Photography.

Night Photography—Picture making at night—indoors and out.

ILFORD LEAFLETS

On Seltona, Enitone, Selochrome Film Pack, Selo and Selochrome Roll Film, Selo Paper, Bromide, Hypersensitive Panchromatic Plates, Roll Films, Selo Fine Grain Panchromatic Roll Film.

Ilford Infra-Red Plates, Selo Infra-Red Roll Films.

ILFORD DARKROOM LAMPS

No. 1

A lamp of novel design which incorporates a clock suitable for timing development. The clock dial rotates past a fixed pointer which is illuminated by the light from the lamp.

Size of Safelight 10 × 8 in.

No. 2

This lamp is contructed so that it is suspended from its point of balance and can be held and locked in any position. It can be used for general indirect lighting or for direct illumination of the loading bench, etc.

Size of Safelight 10 × 8 in.

This lamp can be supplied to order without suspension arms for direct conduit mounting.

No. 3

The use of Ilford Ceiling Reflector Lamps arranged to produce uniform illumination throughout the darkroom increases the efficiency of working to a remarkable degree. With this lamp, fitted with an Ilford Darkroom Safelight, a general illumination of comparatively high visual value is obtained without risk of fogging X-Ray Film.

The Ilford Lamp is fitted with chains, electric bulb holder and one 12 × 10 in. Ilford Safelight.

No. 4

Designed so as to give maximum darkroom illumination with the additional facility of giving immediate white light as and when necessary for purposes of inspecting the film on complete development and fixation. One slight and simple movement effects the required change.

The lighting unit is easily removable and can be used as an inspection lamp. Complete with 40 watt lamp and one 10 in. × 8 in. Ilford Safelight.

Please state voltage when ordering

ILFORD DARKROOM LAMPS

No. 5

This type of rotating turret lamp is a convenience for departments where it is necessary to use various types of safelights.

Any one of three safelights can be brought readily into use by simply rotating the lamp.

No. 6

A lamp of original design, intended for general darkroom illumination. Suitable for wall mounting or for bench work.

Three safelights, easily changeable, have been incorporated in such a manner as to give an even illumination throughout the darkroom.

The lamp is adequately ventilated, a current of cool air passing continuously over the safelights.

Size of Safelights—8 in. by 5 in.

Please state voltage when ordering.

No. 7

Modern darkrooms call for up-to-date methods of illumination. This lamp is constructed to give the maximum amount of reflected light from the ceiling, and at the same time the lower Safelight provides ample direct lighting.

Size of top Safelight	..	12 × 10 in.
Size of lower Safelight	..	10 × 8 in.

WEIGHTS AND MEASURES

BRITISH

Avoirdupois Weight

437½ Grains	=	1 Ounce
16 Ounces	=	1 Pound
¼ Ounce	=	109 Grains
½ Ounce	=	219 Grains

Apothecaries Weight

20 Grains	=	1 Scruple
3 Scruples	=	1 Drachm
8 Drachms	=	1 Ounce
1 Ounce	=	480 Grains

Fluid Measure.

60 Minims	=	1 Drachm
8 Drachms	=	1 Ounce
20 Ounces	=	1 Pint
2 Pints	=	1 Quart
4 Quarts	=	1 Gallon

METRIC

Linear Measure

10 Millimetres	=	1 Centimetre
100 Centimetres	=	1 Metre
1000 Metres	=	1 Kilometre

Weight

1000 Milligrammes	=	1 Gramme
1000 Grammes	=	1 Kilogramme

Fluid Measure

1 Cubic Cm.	=	1 Millilitre
1000 Cubic Cm.	=	1 Litre

Equivalents

64.8 Milligrammes	=	1 Grain
28.4 Grammes	=	1 Ounce
453.6 Grammes	=	1 Pound
1 Kilogramme	=	2¼ Pounds
3.55 c.cm.	=	1 Drachm
28.4 c.cm.	=	1 Ounce
568.24 c.cm.	=	1 Pint
1 Litre	=	35 Ounces approx.
4½ Litres	=	1 Gallon

In the U.S.A. the pint = 16 ozs.; the Quart = 32 ozs.; and the Gallon = 128 ozs.

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